

**METHOD AND APPARATUS FOR DETERMINING FORCES TO BE APPLIED  
TO A USER THROUGH A HAPTIC INTERFACE**

Abstract of the Disclosure

A method and apparatus for determining forces to be applied to a user through a haptic interface. The method includes the steps of generating a representation of an object in graphic space, sensing the position of the user in real space and calculating a force to be applied to a user in response to the user's haptic interface and the user's fiducial object. The user's fiducial object represents the location in graphic space at which the user's haptic interface would be located if the haptic interface could not penetrate the surfaces of virtual objects. In one embodiment, the method calculates a stiffness force to be applied to the user. In other embodiments, the method calculates damping and friction forces to be applied to the user. In one embodiment the step of generating a representation of an object in graphic space includes defining the object as a mesh of planar surfaces and associating surface condition values to each of the nodes defining the planar surfaces. In another embodiment, the step of generating a representation of an object in graphic space includes describing the surface of the object using a coordinate system and associating surface condition values with each set of coordinates of the coordinate system.

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387MBR5473/53.199040-1